1. **What is a stored program computer?**

- Stored-program computer, a computer that stores instructions in its memory to enable it to perform a variety of tasks in sequence or intermittently

1. **What are the four main components of any general-purpose computer?**

- 4 main components: the arithmetic logic unit (ALU), the control unit, the memory, and the input and output devices (collectively termed I/O).

1. **At the integrated circuit level, what are the three principal constituents of a computer system?**

They are gates, memory cells, and interconnections

1. **Explain Moore’s law**.

*- Definition* : Moore's law is a term used to refer to the observation made by Gordon Moore in 1965 that the number of transistors in a dense integrated circuit (IC) doubles about every two years

*- Explain:* Moore's law is based on his empirical observations. The observed data was used to extrapolate the doubling of the number of transistors on a microchip per year. Moore's law's specifics were updated throughout time to better represent real development in transistor density. The doubling interval was raised to two years before being reduced to roughly 18 months. However, Moore's law's exponential nature persisted, generating decades of immense opportunities for the semiconductor sector.

1. **List and explain the key characteristics of a computer family**.

* **Similar or identical instruction set**: In many circumstances, all family members are supported by the same set of machine instructions. As a result, a program that runs on one machine will run on any other. In certain circumstances, the instruction set at the bottom of the family is just a duplicate of that at the top. This implies that while programs can go up, they cannot move down.
* **Similar or identical operating system**: All family members have access to the same fundamental operating system. Additional features are sometimes added to higher-end members
* **Increasing speed :** The rate of instruction execution increases in going from **lower to higher family** members
* **Increasing number of I/O ports**: The size of main memory increases in going from lower to higher family members
* **Increasing memory size** : At a given point in time, the cost of a system increases in going from lower to higher family members

1. **Increasing cost**: **What is the key distinguishing feature of a microprocessor?**

- The integrated aspect of a microprocessor — the way it merges numerous separate circuits into a single device — is its most distinguishing characteristic.

1. **Given the memory contents of the IAS computer shown below**,

|  |  |
| --- | --- |
| Address | Contents |
| 08A | 010FA210FB |
| 08B | 010FA0F08D |
| 08C | 020FA210FB |

**show the assembly language code for the program, starting at address**

**8 A. Explain what this program does.**

**Answer**:

|  |  |
| --- | --- |
| Address | Contents |
| 08A | LOAD M(0FA)  STOR M(0FB) |
| 08B | LOAD M(0FA)  JUMP + M(08D) |
| 08C | LOAD -M(0FA)  STOR M(0FB) |

This program is to store the absolute value of content at memory location 0FA into

memory location 0FB

**01. The ENIAC was designed to help the Army’s *Ballistics Research Laboratory (BRL)* , which was the agency responsible for developing range and trajectory tables for new weapons.**

**02. The first task of the ENIAC was to perform a series of complex calculations that were used to help determine the feasibility of the hydrogen bomb.**

**03. The first publication of the idea of the stored-program concept was in a proposal by John von Neumann for a new computer known as the Electronic Discrete Variable Computer (EDVAC)**

**04. The IAS computer consists of a main memory, an ALU, I/O, and a CONTROL UNIT**

**05. The UNIVAC 1 was the first successful commercial computer and was commissioned by the Bureau of the Census for the 1950 calculations.**

**06. A DATA CHANNEL is an independent I/O module with its own processor and instruction set.**

**07. The MULTIPLEXOR is the central termination point for data channels, the CPU, and memory.**

**08. The term EMBEDDED system refers to the use of electronics and software within a product, designed to perform a dedicated function, as opposed to a general-purpose computer such as a laptop or desktop system.**